Washington State Department of Transportation

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Are WSDOT's highway construction costs in line with national experience?

WSDOT has assembled information from around the state and around the country to answer the frequently-heard comment that highway construction costs in this state are typically higher than such costs in other state. This is not true. Washington State's costs for typical roadway projects are very much in line with comparable projects from other states. However, when it comes to very large and complicated projects, the significant variations in scope and setting for each project limit the usefulness of state-to-state comparisons. The important problem of cost control in those projects must be addressed on a case-by-case basis.

The information is organized by reference to the following questions:

- What are the actual construction costs for typical completed WSDOT roadway projects?
- What are the estimated construction costs for typical proposed WSDOT roadway projects?
- What are the construction costs typical of such projects in other states?
- What about the distinct question of very large and complicated projects here and in other states?
- Is there an FHWA "benchmark" of national experience to assist in the evaluation of Washington's project costs as compared to other states?
- What other information provides insight to the cost of projects in Washington State?

What are the actual construction costs for typical completed WSDOT roadway projects?

Table 1 provides construction cost information for several recently completed or soon-to-be completed WSDOT projects for new highways or major new lane additions to existing highways. Many of the projects also include new interchanges, overpasses, and other facilities.

	Table 1- Typical Completed Roadway Projects In Washington	Actual Cost 2002 $	Lane Miles	$/Lane Mile
US 395, Pasco to Ritzville **1996**	▪ Added 2 northbound lanes; created 4-lane, divided median facility. ▪ Included 8 at-grade intersections; 5 new interchanges; modified one existing interchange. ▪ Few stream crossings or watershed impacts; located in dry, agricultural or barren land; minor archeological issues; very few environmental issues on this corridor.	$122.7	127.42	$1.0
SR 18, Auburn -Black Diamond to Issaquah Hobart Road (multiple segments) **2003**	▪ Added 2 westbound lanes; created 4-lane, divided median facility. ▪ Included 3 new interchanges and modified 3 existing interchanges; included 26 bridges. ▪ One major river crossing and impacts to 42 acres of wetlands; storm water treatment and detention required; located in a forested, semi-urban environment. ▪ Other issues: stabilization of existing landslide prone area; noise walls through residential areas.	$206.9	22.92	$9.0
I-5 HOV, Federal Way to South Seattle **2002**	▪ Added one northbound and one southbound HOV lane. ▪ Lane additions predominantly in median, primarily accomplished in existing right of way, some takings required. ▪ Located in urban environment.	$277.0	37.43	$7.0
US 101, Sequim By-Pass **1999**	▪ Constructed 2 lane bypass of Sequim with provisions for 2 additional lanes in future. ▪ Included 2 full interchanges and one half-interchange; also 4 bridge under-crossings and 1 bridge over-crossing to maintain local street system connections. ▪ Built 40-acre wetland for current and future impacts; provided additional right of way for future development; required relocation of several residences; and a PUD sub-station. Located in semi-urban environment.	$62.6	15.56	$4.0
SR 522, SR 9 to Paradise Lake Road **2000**	▪ Added 2 lanes to existing 2-lane facility; creating 4-lane, divided median facility. ▪ Located in a forested, semi-urban environment; impacts wetlands and streams.	$22.3	5.96	$4.0
I-405 HOV, SR 522 to Swamp Creek **1999/2002**	▪ Added one northbound and one southbound HOV lane predominantly in median, primarily accomplished in existing right of way, some new land was required. ▪ Project included bridge crossings of North, Perry, Swamp and Martha Lake Creeks. ▪ Located in the Swamp Creek and North Creek; in an urbanized area with wetland impact; storm water detention and treatment required.	$88.0	13	$6.8

Lane mile costs in these projects, restated for common reference into year 2002 dollar values, range from about $ 1 million to a little over $ 9 million.

Each of these projects, of course, was unique in critical respects involving scope, overall topography, right of way requirements, residential and business relocations, interchange and intersection needs, stormwater and other environmental requirements and other matters. All the costs driven by such concerns are contained in the cost total shown for each project. The uniqueness of individual projects clearly highlights the difficulty of "costs per lane mile" as a measure to compare the reasonableness of

construction costs among different projects. Nevertheless, the range of costs through a number of typical projects, as shown in Table 1, provides insights into the pattern of costs.

What are the estimated construction costs for typical proposed WSDOT roadway projects?

Table 2 provides some basic information about several typical projects that would have gone into construction if Referendum 51 had passed. The cost estimates have been prepared by WSDOT based on project scope and project information at roughly the current state of design. These projects show estimated costs per lane mile in the same range (in fact, toward the lower end of the range) as illustrated by recently completed WSDOT projects described in Table 1. The projects in Table 2, like those in Table 1, are each unique and the differences between the projects explain some of the variations in project costs, all of which, however, remain within customary ranges.

	Table 2 - Typical Proposed Roadway Projects In Washington	**Estimated Cost in 2002 Dollars**	**Lane Miles**	**Cost per Lane Mile**
I-5, Vancouver-Salmon Creek to I-205 Additional Lanes	▪ To add 2 lanes to existing four lane freeway and construct auxiliary lanes where warranted. ▪ Located in urban area. ▪ Impacts to Salmon Creek, Tenny Creek and wetlands minimized by constructing 20 retaining walls; including noise barriers. ▪ Constructs new bridges over Salmon Creek and at 129th Street.	$35.6	5.0	$7.1
US 12, Burbank to Wallula (Stage 1, 3 & 4)	▪ To add 2 lanes to existing 2-lane facility; creating 4-lane, divided highway. ▪ Located in agricultural land. ▪ Impacts along Columbia and Walla Walla Rivers and at other stream crossings in corridor; some archeological issues. ▪ *Bids for the first phase, approximately 6.5 lane miles, were recently opened and the first phase will be awarded for $6.1 M compared to the engineer's estimate of $ 7.9 M. Bids were received by 7 firms.*	$36.4	25	$1.5
SR 17, Moses Lake - I-90 to Grant County Airport Additional Lanes	▪ To add 2 lanes to existing 2-lane facility; creating 4-lane highway. ▪ Located in semi urban environment. ▪ Updates four signalized intersections. ▪ Project impacts 2.5 acres of wetlands. Uses credits from wetland bank previously constructed; project will include noise wall and stream relocation.	$16.5	6.6	$2.5
US 101, Blyn Vicinity Passing Lanes	▪ To add a 0.4 mile long passing lane in each direction to an existing 2-lane highway. ▪ Located in rural area. ▪ Wetland impact of about 8/10 of an acre. ▪ New right of way required.	$1.8	0.8	$2.2
US 101, Gardiner Vicinity Truck Lane	▪ To add a 1.4 mile truck lane in one direction on existing 2-lane highway. ▪ Located in moderately steep rural area. ▪ Minimal wetland and right of way impacts.	$1.7	1.4	$1.2
SR 270, Pullman to Idaho State Line Additional Lanes	▪ To add 2 lanes to existing 2-lane facility; creating 4-lane, divided highway. ▪ Located in agricultural area recently rezoned for commercial use. ▪ Project impacts 5 acres of wetlands; enhancements to Paradise Creek will offset some of the impacts. ▪ Grade separations will be constructed at two locations. ▪ Poor soil conditions create the need for flatter slopes increasing construction and right of way costs.	$28.7	11.9	$2.4

What are the construction costs typical of such projects in other states?

Table 3 shows an array of completed and proposed projects around the country that are, like the WSDOT projects in Tables 1 and 2, "typical" highway construction projects.

Projects	Table 3 - Typical Projects From Around the Nation	Cost in 2002 Dollars	Lane Miles	Cost per Lane Mile
T.H. 52, Rochester, MN	▪ 11 mile reconstruction project widening road from 4 to 6 lanes. ▪ Located in urban environment. ▪ Work includes interchange improvements, overpass components, ITS implementation and an extensive pedestrian system. ▪ Design-build procurement.	$240.0	22	$9.1
Interstate 287, Cross Westchester Expressway, New York	▪ Replaces and or rehabilitates existing 9.5-mile corridor. ▪ Includes interchange and bridge improvements. ▪ Located in urban environment.	$335.0	50	$6.7
Route 3 North, Boston	▪ Adds one lane each direction over 21-mile corridor. ▪ Includes interchange and bridge improvements. ▪ Located in sub-urban environment. ▪ Design-build procurement.	$395.0	42	$9.4
I-4, Tampa to Orlando	▪ Reconstructed existing 4-lane roadway to a 6 to 8 lane roadway. ▪ Work included: bridge and roadway replacement, widening, realignment and interchange upgrades. ▪ Located in urban and rural areas	$403.0	73	$5.5
I-95, Fairfax and Prince William Fourth Lane, Newington – Occuquan	▪ Located in urban area. ▪ Approximately 4.5 miles in length. ▪ Deferred because of Virginia funding problems. ▪ Planned construction costs only	$37.0	9	$4.1
I-66 Prince William Reconstruction of I-66 / Route 29 I/C	▪ Located in urban area. ▪ Reconstructs interchange. ▪ Deferred because of Virginia funding problems. ▪ Planned construction costs only	$53.0	0	
I-66 Prince William, Gainesville	▪ Additional general purpose and HOV Lanes. ▪ Approximately 5.3 miles in length. ▪ Deferred because of Virginia funding problems. ▪ Planned construction costs only ▪ Located in urban area.	$72.0	21.2	$3.4
Interstate 5 State Street To North Santiam Oregon	▪ Widening one lane in each direction in suburban area. ▪ Approximately 5.16 lanes miles added.	$30M	5.16	$5.8 M
US 26 Sunset Highway Cornell to Murray Blvd Oregon	▪ Widening one lane in each direction in suburban area ▪ Approximately 2.24 lane miles added	$10.6 M	2.24	$4.8 M

This snapshot of national experience provides specific comparisons with typical projects in Washington State. Showing lane mile costs in the range from $ 3.4 million per lane mile to $ 9.4 million per lane mile, table 3 illustrates the rough band of national experience to which straightforward comparisons to Washington State experience can be made, always bearing in mind that unique circumstances affect every project. From comparison of the data above, Washington's per lane mile costs for typical projects are well within the national experience, and actually tend to be in the middle to lower end of the cost ranges. This is not surprising, since the type of projects Washington has been constructing over the past decade are fairly comparable in scope and nature to the national experience. Moreover, the largest single cost element, payments of the construction contract price to the private firm performing the construction work, are almost invariably established in all states by competitive bidding that provides an intensive market discipline to the pricing of the work.

In sum, Tables 1, 2 and 3 together demonstrate that the costs of typical highway construction projects around the United States and in Washington State are very close. This conclusion about the reasonableness of WSDOT's typical project costs (and past track record) is important, since some have been led to believe that our costs for all projects are outside the "normal" range of consideration.

What about the distinct question of very large and complicated projects here and in other states?

Very large projects, whose scale, complexity and setting puts them apart from the usual highway construction projects, present very special cost issues, here and elsewhere.

These projects, have costs that are often higher – significantly higher – than typical highway projects. There are many reasons for this. An extensive literature and body of comment on the topic reflects the high degree of local and national interest in the problem of costs of such projects.

The specific considerations for the high cost of the projects of this scale (sometimes referred to as "mega-projects" when they approach or exceed the billion dollar range) include, among others:

- Urban settings forcing elaborate design solutions and specialized construction means and methods and high materials costs.

- Complicated, heavily scrutinized and sometimes highly controversial environmental or neighborhood impact concerns.

- Heavy costs for traffic management and traffic mitigation during construction.

All of these projects are expensive. Some are relatively more or less expensive than others. The projects vary so widely in the details of their scope and setting and there are, in fact, so few such projects now in contemplation or construction, that "average" or "median" cost have little statistical relevance. In other words, scope and setting drive the costs of these large projects. Each project, in effect, stands on its own record and merits from a cost standpoint.

How should the variations in scope and scale among the mega projects be dealt with to determine if their costs are appropriate? For projects that have a significant number of complex interchanges that add high costs with few lane miles, should those costs be included or not? For projects that have significant amounts of new right of ways in expensive urban areas, should those costs be included or not? For projects that include transit elements (such as light rail or direct access ramps and HOV freeway-to-freeway connections), should those costs be included or not? What about the extent of city street improvements or other infrastructure improvements, like major utility relocation or reconstruction of major retaining walls? WSDOT has looked at doing comparisons a number of ways, each with its own strengths and weaknesses. For instance, extracting high cost interchanges, lane mile costs between projects become reasonably well correlated. Bridge costs among projects were similar; concrete pavement costs per lane mile were similar; drainage costs per lane mile were similar. However, the overall cost per lane mile calculated using this methodology does not include all project costs and therefore might be criticized as misleading.

WSDOT therefore has simply put all of the costs for the project together and divided by the number of project lane miles. Table 4 contains a survey of eight of those projects, some here in Washington and others from around the country. All project costs in Table 4 have been adjusted up or down, depending on circumstances, to show project costs in year 2002 dollars.

Table 4 – Large Projects For Washington State and Around the Nation			Cost in 2002 Dollars	Lane Miles	Cost per Lane Mile
SR 509, Corridor Project	▪	New alignment connecting SR 509 to I-5, six miles of I-5 improvements and a south access to SeaTac International Airport.	$778.0	33	$23.4
	▪	Located in urban area requiring relocation of up to 240 or more families and 29 businesses, with a right-of-way cost of $122 million.	to		to
	▪	Wetlands bridged in order to reduce wetland impacts to 0.35 acres.	$859.0		$26.0
	▪	Construction of 22 bridges including two structures across S. 200th St. and four tunnels under I-5 for ramp connections.			
	▪	Major retaining walls to minimize further impacts and preserve a municipal water tank.			
SR 99, Alaskan Way Viaduct and Seawall Project	▪	Located in urban, industrial and commercial area	$3.2 Billion	15	$213
	▪	Replaces existing viaduct's 6 lanes in new tunnel along Seattle's central waterfront. New bridges connect new tunnel to the north and south, utilizing the existing Battery Street Tunnel.	to		to
(Tunnel option)	▪	Replaces central Seattle portion of the seawall ($820M)	$3.8 Billion		$253
	▪	Significant right of way and utilities relocation required ($510M).			
I-405, Corridor Program	▪	Will add up to 2 lanes north bound and 2 lanes south bound, plus auxiliary lanes; results in an 10-lane divided freeway facility through the project corridor.	$7.3 Billion	169	$43.0
(Approved plan)	▪	Located in dense urban areas.	to		to
	▪	Impacts to watersheds and 25 acres of wetlands.			
	▪	Requires approximately 1000 parcels of right of way worth $1.4 Billion.	$8.7 Billion		$51.0
	▪	Includes over $1.7 Billion of infrastructure for HOV and Bus Rapid Transit System, including direct access ramps, freeway-to-freeway connections, and BRT stations, plus over $900 million for arterials.			
	▪	Requires reconstruction of most interchanges and bridges including major interchanges at I-405/SR 167, I-405/SR 520, I-405/I-90, I-405/SR 522 and at junctions with I-5.			
SR 520, TransLake Corridor (6 lane option)	▪	Replaces existing floating bridge with new wider bridge.	$3.8 Billion	18 new/ 32 rehab	$76.0
	▪	Impacts to watersheds and 17 acres of wetlands; extensive permitting mitigation and other costs.			
	▪	Relocation of several homes and business.	to		to
	▪	Reconstruction of 2 interstate interchanges including 13 lane miles of interchange bridges and structures; also numerous other smaller bridges.	$4.6 Billion		$91.0
I-25, T-Rex – Denver Colorado	▪	Located in open sub-urban area.	$1.6 B	78	$20.5
	▪	New right of way required in some parts of corridor; median widening in other parts of corridor.			
	▪	Cost includes "Light Rail element" (approx. $800 million)			
I-90, I-93, Big Dig, Boston	▪	Replaces and or rehabilitates existing freeway.	$14.63 B	114	$128
	▪	Mix of elevated roadway, tunnels and bridges over waterways.			
	▪	Located in urban environment.			
I-15, Utah - Salt Lake	▪	Located in urban environment.	$1.63 B	85	$19.2
	▪	Some strip right of way required.			
	▪	Extensive city grid road network and parallel highways available for traffic mitigations.			
Completed 2001	▪	Reconstructed existing and widened from 6 lanes to 10 or 12 lanes depending on location			
SR 130, Austin	▪	Located in rural undeveloped area	$1.5 B	445	$6.5
2006 completion	▪	New highway connecting I-35 and I-10			
	▪	90 mile corridor			
	▪	Design Build			

Juxtaposition of proposed projects in Washington State with projects elsewhere yields a variety of comparisons, all of which must be regarded with caution because of the significant variations among the projects.

For example, our SR 509 project, now estimated at a lane mile cost on the order of $ 23 to $ 26 million, is somewhat comparable to the Salt Lake City I-15 project ($19.2 million per lane mile) from a cost standpoint. Both projects have similar urban freeway expansion elements (I-5 expansion is a significant part of the SR 509 project) but SR 509 is different in that it requires substantial new right of way ($122 million) for a significant portion of the project length.

Interesting comparisons can also be drawn between the cost for proposed widening of I-405 here in Washington State and the I-25 "T-Rex" project in Denver, Colorado. Here the elusiveness of meaningful "lane mile cost" comparisons are strikingly shown by the fact that large cost elements in each project are for transit purposes. I-25 shows a lane mile cost of approximately $ 21 million per lane mile. *Included in that lane mile cost (seventy lane miles) is approximately $ 800 million of project investments in light rail.* I-405, a project with more lane miles, includes within the overall project lane mile cost of $43 – $51 million about $600 million for Bus Rapid Transit system and another $1.1 billion for HOV infrastructure to make this BRT and HOV system work effectively. I-405 also includes $900 million for new arterials, arterial widening, and expanded approaches to the freeway in east King County and in Snohomish County. I-405 carries an estimated cost of about $ 1.4 billion for right-of-way takings, a burden that the I-25 project was largely spared because much of the lane expansion could be achieved in unused median areas. This lower-cost widening strategy is unavailable for most of I-405, which passes through the urban centers of Kirkland, Bellevue and Renton. I-405, moreover, requires reconstruction of a far greater volume of bridges and interchanges than did I-25, as well as considerably more extensive requirements for wetlands, habitat and water quality protection.

It is important to note the I-405 project estimate, now carrying substantial costs for right of way, bus rapid transit and HOV, and arterials can be used as an excellent example of why early planning estimates for large, undefined projects can go awry. Early in the planning phase of this project, WSDOT planning staff provided some early figures of what a major 2-lane expansion of the entire corridor on I-405 (30+ miles) might cost. Picking an average cost of about $5 million per lane mile, the total cost for the I-405 corridor project was calculated at around $650 million (late 1990's dollars). The $5 million per lane mile reflected typical median-widening HOV projects at the time, but it was hardly adequate to cover the scope items included in the I-405 corridor project nor could it take account of the setting to which it applied since only a small portion of the corridor was suited to median widening. As soon as the intensive corridor planning process began, it was clear to all the planning participants that the early number would not in fact accurately depict real costs for this project. Fortunately, the comprehensive review completed during the Cost Estimate Validation Process (CEVP) has helped define and document the complex scope issues in this project (and others), reflect the complexities of construction in the urban setting, as well as illuminate and quantify project risk issues.

Finally, comparisons can be drawn between the "Big Dig" Central Artery/Tunnel project in Boston and the proposed viaduct replacement program along Seattle's Alaskan Way. Per lane mile estimates for the viaduct program reflect that a much shorter stretch of waterfront roadway will be replaced in Seattle than in Boston, isolating the costs to the most expensive tunneling sections and the associated grade changes in Seattle whereas in Boston much of the overall construction was achieved in less expensive elevated or at-grade structures. Furthermore, the seawall replacement component to the Alaskan Way project had no direct counterpart in Boston. And it appears that requirements for acquiring new right of way, while extensive in Boston, would be much greater to configure a serviceable new transportation facility as envisioned for the waterfront in Seattle.

In summary, large projects, here and elsewhere, are subject to extraordinary cost concerns and considerations. Because projects are so unique, there is no "national average." Cost management on each project depends on the circumstances and opportunities each project presents. We at WSDOT and all the taxpayers of this state have strong reason to be concerned about delivering such projects in the most cost efficient manner. Issues of project scope and scale, procurement strategies and construction impact and traffic mitigation (one of the largest construction cost considerations) have to be aggressively managed. We are committed to doing that for this state's large projects.

Is there an FHWA "benchmark" of national experience to assist in the evaluation of Washington's project costs as compared from state to state?

FHWA heretofore made available by FHWA about highway lane mile costs has many shortcomings and limitations, so much caution should be taken when trying to apply FHWA data to specific projects. One FHWA report from 199- gives the figure "$10 million per lane mile, FHWA Urban" for programmatic estimates of infrastructure costs nationwide. Our inquiries about the FHWA number yielded the following:

- The "FHWA Urban" cost figure is from an earlier study that is no longer used by FHWA for any purpose. In fact, FHWA told us that they are no longer able to find any of the specific "source" data or identify the underlying projects on which the earlier analysis may have been based. They further indicated that the intent of the information was not to create a standard benchmark, but rather, for purposes of national infrastructure needs identification, to use that number for estimating purposes.

- According to FHWA, the term "Urban" in the old study was used to characterize any project area with population greater than 5000. The study data reportedly contained a mix of urban and distinctly semi-urban projects. Further, the study did not specifically target data on projects in complex, densely developed, downtown urban settings that are typical of the costly and complex mega-projects here and across the country.

- FHWA is currently working on a new study of highway costs. The project is hampered by lack of funds and by the small number of highway projects today being built across the country -- a significant barrier to producing statistically meaningful results. FHWA has in fact gathered data from six states only. The study's methodology, moreover, will attempt to "back out" of the cost numbers such high cost factors like interchanges and mitigation. This approach will severely restrict the use of the data in the future.

Our conclusion is that the "FHWA Urban" number cannot be viewed as a reasonable benchmark for mega project estimating purposes. However, it does seem to be in line with "typical" urban project costs here and around the country.

What other information provides insight to the cost of projects in Washington State?

Several other issues enter the project cost discussion from time to time.

Contractor's payment of sales tax

Washington State is unique among the fifty states, to the best of our knowledge, in requiring the addition of sales tax to contractor's invoices to state and local governments on transportation construction projects. The size of the premium this adds to project costs as contrasted to other states is difficult to state with precision, but our estimate in that, in general, it presents a cost premium of about 8% as compared to other states, other things being equal. The arguments for and against this practice lie in tax policy, not in

transportation policy, engineering or project delivery. Change would have to be taken up with the legislature.

Davis-Bacon and "prevailing wage" laws.

The effect the state's "prevailing wage" law may have on relative costs is frequently raised. A national consulting firm reported to the Joint Legislative Audit and Review Committee in 1998 that the overall impact to highway program costs of the state's prevailing wage was might be estimated at about forty-four/hundredths of one percent.[1] In a survey WSDOT conducted last year on highway construction costs,[2] we learned that of the 25 states responding, 17 have a state "prevailing wage" law like the law in this state. In any case, *every* state must comply with the federal Davis-Bacon law regarding payment scales on highway work supported by federal funding, however modest in amount. This would suggest that the *law* on wage levels probably makes for little difference among the states.

Labor market conditions, however, are the basis on which wage scales are set both under Davis-Bacon and state prevailing wage laws. Labor market conditions are a function of *economics,* not law. WSDOT has discussed this question on many occasions with the Associated General Contractors as well as with successful and competitive contractors who routinely perform heavy civil construction with a non-union work force. The information consistently received is that for contractors to obtain the worker experience and productivity necessary to profitably and competitively perform work of this kind, the market requires payment of wages that are at or close to union scale, which are in turn at or close to Davis-Bacon and prevailing wage rates.

Market conditions for materials and labor

It is, of course, common knowledge that construction costs *do* in fact vary from region to region around the country because of local market conditions affecting costs for labor and materials. Insights into these regional fluctuations in construction inputs can be gained from the data gathered by *Engineering News-Record*, the national construction industry trade journal, and from the US Department of Labor's Bureau of Labor Statistics web site. *ENR* publishes once a month, for example, a spot sample of asphalt paving prices, Portland cement prices, crushed stone prices, and redi-mix concrete prices gathered in twenty large North American cities. The most recent information, for example, lists the price of redi-mix concrete (3000 psi, delivered) as $74.00 per cubic yard (cy) in Seattle, as contrasted to $57.00 per cy in Birmingham, $90.48 per cy in Baltimore, and a twenty-city average of around $70.00 per cy. While this tiny sample of information would certainly tend to rebut the notion that construction costs are seriously out-of-norm in Washington State, *ENR* explicitly cautions that it is a misuse of its information, reflecting misunderstanding of its methodological limitations, to make city-to-city comparisons.

A different data set provides pertinent labor cost information, which demonstrates the variation of cost rates for labor across the country. According to recent US Department of Labor's Bureau of Labor Statistics web site, the median hourly labor rate for equipment operators in the United States is $16.42 per hour, as contrasted to the 90th percentile rate of $28.19 per hour and a 10th percentile rate of $10.29 per hour. (Washington State average labor rate for equipment operators is $21.85 per hour.) This market condition driven price difference for labor costs undoubtedly has an effect on project costs in Washington State when compared to other areas, most likely making our projects cost more than some, but the exact effect is unclear because it is almost impossible to control for the number of variables in project

[1] Jont legislative Audit and Review Committee, *Department of Transportation Highways and Rail Programs Performance Audit Report*, March , 1998, 5-1 to 5-11.

[2] This survey is reported at http:www.wsdot.wa.gov/biz/construction/I-C_Const_Cost.pdf and has been discussed with the legislative transportation committees. It concluded that differences for states without prevailing wages laws were minimal, since most use the federal wage rates anyway.

construction (type of equipment, approach to work, physical constraints on site, traffic maintenance requirements, to name a few) to determine the exact impact of labor price differences.

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In conclusion, the suggestion that highway construction costs in Washington State are typically out-of-line with national experience is contrary to the available information that we have gathered on the topic. Typical projects fall well within the cost range of projects around the country. The costs of a typically large and complex, however, are very high, reflecting their unique settings and the unique scopes that, in each instance, have been developed with multi-disciplined and multi-jurisdictional teams and committees over the last two years based, among other things, on extensive public outreach.